

VII. *A Revision of the Tipulid genus Styringomyia, Lw.*
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[Read February 4th, 1914.]

PLATES XIX-XXV.

THE genus *Styringomyia* is an unusually interesting one from several points of view. In the first place, several peculiarities of structure give it a most isolated position among the Tipulidae: it differs from all the other members of the family in (1) the largely developed prothorax, which is less reduced than in any other Diptera with which I am acquainted, the nearest approach being perhaps made by *Cylindrotoma*; (2) the possession of a very definite chaetotaxy of the head and thorax, a condition which is extremely rare among the Nematocera; and (3) the structure of the genital organs, especially the ovipositor of the female, which is very short and complicated in structure, and altogether unlike the ensiform organ characteristic of practically all other Tipulidae, Cylindrotominae excepted. These structural features make the genus a difficult one to place; since no allies can be pointed out it might well be removed from the Antochini (*Limnobina anomala*), where Osten-Sacken located it, and form a separate division of its own.

Styringomyia is also interesting from the point of view of variation, owing to its great tendency to form local species or races, but it is also noteworthy that certain species have attained a wide distribution, and occur side by side with a number of different local forms. In the notes which follow these forms have been regarded as distinct "species," because it has usually been found that even slight colour variations are accompanied by structural modifications in the genitalia, but whether these forms can interbreed in nature can only be determined by experiment, while more extensive material is required in order to decide what characters should rightly be regarded as specific.

The genus was first described by Loew (1846) from a single female specimen preserved in copal; subsequently the
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same writer found a male specimen, which he regarded as representing a distinct species, in Baltic amber; this he named but did not describe in his pamphlet on the amber Diptera ("Bernstein und Bernsteinfauna," p. 38). Subsequently Osten-Sacken (1869) gave some notes on a specimen in his possession in a lump of copal from Zanzibar. These three specimens seem to be all that are known in a fossil or subfossil state, and unfortunately they all appear to be lost. Prof. Meunier informs me that he has made a number of endeavours to trace Loew's types, but always without success, and that in all the large collections of amber insects with which he is acquainted he has never met with a specimen. The genus is unrepresented in the amber collections in the British Museum, and is evidently very rare in a fossil state, a fact which suggests that its apparently primitive characters may not be such in reality.

Although Osten-Sacken (1873) mentions having met with some recent specimens in the Stockholm museum, the first living species was not described until in 1901 Grimshaw introduced his *S. didyma*. Since that time nine additional specific names have been proposed, but two of these names must be relegated to synonymy. In the present paper fifteen new species are described, bringing the total number of known forms up to twenty-three, all from the tropics of the Old World. In all probability, however, this number represents but a percentage of the species which actually exist.

Of the life-history and early stages of the members of this genus nothing is known, and the only thing recorded concerning their habits relates to the attitude of rest, which is very remarkable, resembling that adopted by the *Phasmidae*. Dr. N. Annandale, referring to some specimens of *S. ceylonica* taken at Puri, Orissa, says: "This species rests on walls with the two anterior pairs of legs stretched out straight in front and the posterior pair behind, resembling a stray piece of cobweb." The late Mr. F. W. Terry made a similar remark to the writer regarding the resting habits of *S. didyma*, and de Meijere (1911) has also recorded a statement of Jacobson's to the same effect. It is possible that the enlargement of the prothorax may have some connection with the peculiar posture adopted by the insect.

The writer wishes to express his indebtedness to the following gentlemen for assistance in the preparation of

this paper: to Mr. C. P. Alexander for the loan of the type of *S. howardi*; to Dr. N. Annandale and Mr. F. H. Gravely for the loan of the types of *S. flava* and *S. obscura* and of other specimens from the Indian Museum collection; to Dr. Günther Enderlein for the loan of the type of *S. solocipennis* and for information regarding *S. annulipes*; to Mr. P. H. Grimshaw for specimens of *S. didyma*; to Prof. J. C. H. de Meijere for the loan of all the Javan specimens here mentioned; and to Dr. Yngve Sjöstedt for the loan of the types of *S. crassicosta* and *S. sjöstedti*.

Characters of the genus STYRINGOMYIA, Lw.

The genus has never been fully described, and as there is very little variation in general structure among the different species, a full generic description will save much repetition in the subsequent part of this paper. It is possible that a few characters may be mentioned below which are not applicable to every species, but this has as far as possible been avoided.

Head roundish or slightly longer than broad, narrowed behind into a fairly distinct neck; the eyes separated by a broad front, and with a slightly raised tubercle between them at the base of the antennae. On the front are three pairs of strong bristles; there are two pairs of smaller bristles at the back of the eyes and a few small hairs on the occiput. *Proboscis* not more than half as long as the head. *Palpi* slightly hairy, four-jointed, the first joint not much longer than broad, the second and third a little longer than the first, and all three somewhat thicker apically; the fourth joint cylindrical, thinner than any of the others, and about half as long again as the second or third. *Antennae* sixteen-jointed, the first joint cylindrical and about two and a half times as long as broad, the second nearly round, a trifle broader in diameter than the first, the remaining joints oval, slightly decreasing in size apically; the first two joints are practically bare, the remainder bear a few stiff hairs about the middle.

Thorax. The prothorax is largely developed, the *pronotum* being divided by a transverse suture into two portions, the anterior part roughly triangular in shape and carrying a row of about ten strong bristles which project over the occiput; the posterior portion is more or less broadly horse-shoe shaped, and bears two bristles on each side. The *mesonotum* is much less prominent than in most other Tipulidae, but has essentially the same structure, being divided by a V-shaped suture a little behind the middle, though the pair of

small pits so commonly seen in other Limnobiinae near the anterior margin is not distinctly noticeable; there are two submedian rows of small bristles in front of the suture, and a pair of large ones behind the suture; there are also three strong bristles on each side-margin, extending outwards, one just in front of and two behind the suture. The *scutellum* is separated from the main portion of the mesonotum by a pair of elongate-triangular depressions; it bears two strong bristles near the middle. The *meso-epimerum* bears a row of three or four bristles, just below the roots of the wings, and there is also a row of bristles on the *meso-sternum*.

The Male Abdomen is of a very primitive type. The first segment is a little shorter than broad; segments 2-7 all about equal in length, roughly twice as long as broad; segment 8 very short, but quite distinct and quite disconnected from the hypopygium, its tergal and sternal plates about equal in size. The ninth segment (*hypopygium*) consists of a tergite, two large side pieces and a sternite, which are connected with one another only by membrane. The tergite is quite a large plate, shortly pubescent in its apical portion and terminating in two strong bristles. The sternite is rather larger than the tergite, rounded or truncate apically, and has articulated to it a weakly chitinised, various-shaped, very pubescent plate, which is here regarded as representing the tenth sternite. The side pieces are rather longer than the tergite or sternite and are terminated by a long spine; they bear an upper and a lower appendage, the upper one in nearly all the species being a membranous, strap-shaped structure terminating in one long bristle and one short one; the lower one is elaborately divided up and frequently carries numbers of black spines. The penis sheath (*admiculum*) is highly chitinised at its extremity and affords excellent specific characters, though it has not been possible to figure it in every case. Apart from the appendage to the ninth sternite, which may not have been correctly homologised, there are no distinct structures representing the tenth segment.

The Female Abdomen is shorter than that of the male, and apparently less primitive, since the eighth and ninth segments are fused and quite inseparable after boiling in potash. The ovipositor is very short but extremely complicated; I am not sufficiently sure of the homologies of the different parts to give a detailed description. The suture between the eighth and ninth segments is less evident than in other Tipulidae, but it can sometimes be made out in the dry specimens, though in microscope preparations it is less evident. The sternite of the seventh segment is very much larger than the tergite and serves to cover the terminal segments. I have called it the operculum; its outline varies according to the species.

Legs rather thickly clothed with long hair and with scattered stiff bristles; in the male the hairs are much longer than in the female, and the middle tibiae usually have a small tuft of bristles close to the tip; femora slightly thickened apically; tibiae without spurs at the tip; claws simple; empodia distinct, pulvilliform, a little more than half as long as the claws. Middle legs shorter than either of the other pairs, the proportions of the joints being roughly as follows:—

	Femur.	Tibia.	Tarsus.	Whole leg.
Front leg	19	18	17	54
Middle leg	18	13	11	42
Hind leg	20	16	13	49

Wings as long as the abdomen (*i. e.* in their total length; they do not reach to the tip of the abdomen) in the male; in the female slightly longer than the abdomen; costal fringe distinct; subcostal and radial veins with rows of small bristles; wing-surface microscopically pubescent. Sc just distinct from R, but lying extremely close to it; base of R dipped downwards; R₁ lying in contact with the costa from the origin of R_s onwards; Sc terminates and R originates at about one-third of the wing-length. R₂₊₃ very short, joining the costa at a high angle just beyond the middle of the wing. R₄₊₅ almost straight, running practically into the tip of the wing. M₁ and M₂ not separated; M₃ closely approximated to M₁₊₂ at the tip of the discal cell, and occasionally fused with it for a short distance. Ascending portion of Cu₁ meets M₃ at about one-third of the length of the discal cell, and fused with it for a long space; the terminal free portion of Cu₁ is somewhat indented downwards, so that the cell Cu₁ is slightly contracted beyond the middle, and expands again a little at the apex; An nearly straight; Ax curved or bent near its tip, and not reaching the middle of the wing.

Table of the known living species of STYRINGOMYIA.

1. Wings quite unspotted; tibiae unicolorous 2.
Wings with fairly distinct though small blackish spots (except in *S. impunctata*); tibiae at least with traces of dark rings 4.
2. Yellow species, wings hyaline *flava*, Brun.
Blackish species, wings strongly infuscated 3.
3. Femora yellow with broad blackish rings *obscura*, Brun.
Femora blackish except at the base *solocipennis*, End.
4. Darker species; anterior half of mesonotum mainly black . . 5.
Lighter species; anterior half of mesonotum not black (unless discoloured) 8.

5. A distinct dark patch towards the base of the wing over vein
Cu 6.
No such patch present 7.
6. Ax sharply bent downwards near the tip . . . *marshalli*, sp. n.
Tip of Ax curved downwards *lineaticeps*, sp. n.
7. Femora yellow with two black rings *mahensis*, Edw.
The dark rings of the femora so broad as almost to obliterate
the yellow *nigrofemorata*, sp. n.
8. No darkening of the membrane round the R-M cross-vein,
though many of the veins are dark . . . *impunctata*, sp. n.
A distinct dark spot on the membrane round the R-M cross-
vein 9.
9. The short vein R_{2+3} largely dark (compare also *crassico-*
costa ♀) 10.
 R_{2+3} entirely pale; the central dark spot does not extend into
cells R_1 and R_{2+3} 11.
10. Joints of palpi pale at their bases *variegata*, sp. n.
Palpi entirely blackish; all markings much less sharply defined
nigripalpis, sp. n.
11. Tip of Ax angulated, with a stump arising from the angle, and
a more or less distinct dark spot on the membrane round this
stump 12.
Tip of Ax without any stump (except sometimes in *S. formo-*
sana), and even when darkened the cloudiness does not
extend on to the membrane 16.
12. Slight but obvious dark clouds surrounding the tips of all the
veins *ceylonica*, Edw.
No cloudiness on the membrane surrounding the tips of the
veins, even though the tips themselves may be somewhat
darkened 13.
13. Second joint of antennae (normally) considerably darkened,
often almost black 14.
Second joint of antennae yellowish, or occasionally slightly
darkened 15.
14. Male abdomen with a continuous median longitudinal dark
stripe *vittata*, sp. n.
Male abdomen without such stripe . . . *crassicosta*, Speiser.
15. Tenth sternite of male not trilobed *sjöstedti*, sp. n.
Tenth sternite of male trilobed *annulipes*, End.
16. Tip of Ax distinctly darkened 17.
Tip of Ax scarcely or not at all darkened 20.
17. Hardly a trace of darkening at the apex of the discal cell
formosana, sp. n.
Veins at apex of discal cell obviously darkened 18.

18. Head bristles yellowish; tip of Ax bent backwards *javana*, sp. n.
 Head bristles black (normal); tip of Ax rounded . . . 19.
19. Veins (except Ax) not darkened at their tip . *jacobsoni*, sp. n.
 All the veins darkened at their tips . . . *fryeri*, sp. n.
20. Male abdomen with dark patches on the basal halves of segments
 2-6 21.
 Male abdomen without dark patches in this position . . . 22.
21. Thorax with fairly evident though ill-defined darker markings
bancrofti, sp. n.
 Thorax almost unicolorous yellow-ochreous . *himalayana*, sp. n.
22. Vein Cu somewhat darkened *nepalensis*, sp. n.
 Vein Cu not darkened, except at origin of Cu₁ *didyma*, Grim.

FOSSIL SPECIES.

1. *S. venusta*, Lw. (1845).

Although this species has only been imperfectly described, it must, if Loew's figure of the wing is accurate, be quite distinct from all known living species. According to this figure, Cu₁ is not at all indented after leaving M₃, and Ax runs practically straight to the hind margin, while in all living species it is curved or bent downwards at its tip. In addition to this Sc is not shown, but this is probably an oversight; its presence has also been overlooked in some of the recently described species. In all other respects the descriptions of Loew and Osten-Sacken would apply almost equally well to any of the other species.

Copal (origin not stated).

RECENT SPECIES.

GROUP I.

Wings without the least trace of dark dots; tibiae quite unicolorous; side pieces of male genitalia terminating in three spines.

2. *S. flava*, Brun. (1911).

Figs. 10 and 11.

There is very little to add to Brunetti's description. The second joint of the antennae is dark brown; the posterior margins of the abdominal segments with brown bands, narrowed but not quite interrupted in the middle. The tibiae and tarsi are entirely yellow, except the fifth tarsal joint, which is dark brown.

Type in the Indian Museum, Calcutta.

Loc. Tenmalai, Travancore, S. India. 1 ♂.

3. *S. obscura*, Brun. (1911).

Figs. 46 and 47.

Wings without distinct dark markings, but the whole membrane slightly infuscated, and there are slightly darker clouds about the apex of the upper basal cell and above the base of Cu; all the veins blackish.

Type in the Indian Museum, Calcutta.

Loc. Thamaspur, Nepal. Known only from one female. (Brunetti was mistaken as to the sex of his specimen.)

4. *S. solocipennis*, End. (1912).

Figs. 12 and 13.

A very dark-coloured species. Wings rather strongly infuscated, a little darker towards the costa. Side pieces of hypopygium with three terminal spines, as in *S. flava*; adminiculum with a few hairs at its tip—a most unusual character.

Type in the Stettin Museum.

Loc. MADAGASCAR: Ambodimanga (*Hammerstein*), 3 ♂.

GROUP II.

Wings with fairly distinct dark specks (except in *S. impunctata*) on the R-M cross-vein and at the base of the ascending portion of Cu₁, usually also at the junction of or the cross-vein connecting M₁₊₂ and M₃. Legs with dark rings or spots in the following positions: on the front and middle femora one just beyond the middle and another usually a little before the tip; on the hind femora one in or immediately before the middle and another a little before the tip; on all the tibiae one just before the middle and another at the tip; the fifth tarsal joint always blackish. Side pieces of hypopygium (except in *S. sjöstedti*) terminating in one spine.

5. *S. marshalli*, sp. n.

Figs. 5, 48 and 49.

Head dark blackish brown, palpi and first two joints of antennae entirely black; flagellum dark brown. *Thorax* almost entirely black; with grey reflections; lower half of pleurae yellow. *Abdomen* black (probably discoloured). *Legs* yellow, the rings very distinct, black; on the fore and mid femora the apical ring includes the whole apex, on the hind femora it leaves the apex narrowly yellow. The tips of all the tarsal joints are dark brown. *Wings* as in the figure;

veins dark, except the costa, R_2 , R_{2+3} and An, which are yellowish. There is a slight darkening of the membrane at the extreme base of the wing in the cell Ax. Halteres yellowish, the knob somewhat darkened.

Type in the British Museum.

Loc. MASHONALAND: Salisbury, March 1900 (*G. A. K. Marshall*), 1 ♀.

6. *S. lineaticeps*, sp. n.

Figs. 3, 4, 14 and 50.

Head blackish, with a narrow median longitudinal yellowish line. Palpi black, the joints somewhat lighter at the base. Antennae with the two basal joints entirely black, the flagellum brownish, with indications of a darker ring on each joint. *Thorax* mainly black dorsally, with light grey patches as in the figure; pleurae entirely yellowish. *Abdomen* of male yellowish-brown, with a rather large dark brown patch at the base of each segment, and another towards the hind margin; the actual hind margin blackish. In the female the abdomen is darker and all the markings are obscured. *Legs* as in *S. marshalli*, but in the female there is just a trace of the yellow ground-colour at the tips of the fore and mid femora. *Wings* much as in *S. marshalli*, but Ax is evenly curved to the hind margin, and there is no dark patch in the cell Ax.

Type in the British Museum, presented by the Imperial Bureau of Entomology.

Loc. BRITISH EAST AFRICA: Muminas district, N. Kavi-rondo, 3. ix. 1911 (*C. W. Woodhouse*), 1 ♂ 1 ♀ taken *in coitu* in tent.

7. *S. mahensis*, Edw. (1912).

This species is not figured, as the genitalia of both sexes are identical in structure with those of *S. annulipes*, End. The difference of colour between the two forms is, however, very striking. In *S. mahensis* the mesonotum is mainly black, and the rings on the legs are black and much broader than in *S. annulipes*, though the tips of all the femora remain yellow. The angle of Ax always carries a distinct spur, though this varies in length. Otherwise there is no noticeable variation, even in colour.

Type in the British Museum.

Loc. SEYCHELLES IS.: Mahé (*H. Scott*), 10 ♂, 2 ♀.

8. *S. nigrofemorata*, sp. n.

Fig. 51.

Head dark brown. Antennae with the first joint dark brown below, lighter brown above; second joint dark brown; remaining joints yellowish brown with traces of darker rings. *Thorax* mainly black; light grey areas in the middle of the pronotum, on the middle of the posterior half of the mesonotum and in the middle of the scutellum; upper half of pleurae dark brown, lower half orange-yellow. *Abdomen* black (discoloured). *Legs*: femora mainly blackish brown, light yellowish on the basal fifth, a narrow yellow ring at the base of the apical third, tip yellow. Tibiae brownish in ground-colour, with the usual dark rings, which are fairly broad. *Wings* slightly infuscated; the dark spot over the R-M cross-vein does not extend into cells R₁ or R₂₊₃. M₁₊₂ and Ax are somewhat darker than the other veins; Ax with its tip evenly curved to the hind margin. Halteres rather dark.

Type in the British Museum.

Loc. MALAY STATES: Taiping (*L. Wray, junr.*), 1 ♀.

9. *S. impunctata*, sp. n.

Figs. 15, 16, 52 and 53.

Head yellowish, with some small dark brown patches. First joint of antennae dark below, light above; second dark brown. *Thorax*: pronotum dark brown at the sides, yellow in the middle. Mesonotum yellowish-brown; a narrow median dark brown line extends from the front half-way back towards the suture; on each side of this along the line of bristles, is another narrow dark brown line, nearly reaching the suture, where it bends outwards to the margin. Scutellum and postnotum dark brown with a yellow median line. *Abdomen* dingy yellowish, the basal halves and the posterior borders of the segments obscurely brownish. *Legs* (those of the male missing) dingy yellowish, the rings complete, fairly narrow, normal in position. Joints of tarsi slightly darker at the tips. *Wings* without any dark spots on the membrane, except a very slight trace round the R-M cross-vein. All the veins dark except Costa and R₁. Ax angulated, the apical portion slightly recurrent, a very short spur at the angle.

Type in the British Museum.

Loc. NORTHERN NIGERIA: Zungeru, Nov. 1910 (*Dr. J. W. Scott Macfie*), 1 ♂, 1 ♀.

10. *S. variegata*, sp. n.

Figs. 1, 2, 17, 18 and 54.

Whole insect yellow with rather sharply defined dark brown markings as in fig. 1. Underside of the first and the whole of the second segment of the antennae dark brown. Segments 2-6 of abdomen all similarly marked, seventh segment in male with a continuous median dark stripe; ninth tergite dark brown; side pieces of hypopygium yellow, brown at the base. In the female abdomen the basal half of each segment is dark, the apical half also mainly so. *Legs* with the usual dark rings, all of them complete. *Wings* as in the figure (fig. 2). Knob of halteres dark.

Type in the Paris Museum, preserved in alcohol.

Loc. GERMAN EAST AFRICA: Kilema, 30. iii. 1912 (*Ch. Alluand* and *R. Jeannel*), 2 ♂, 2 ♀.

11. *S. nigripalpis*, sp. n.

Figs. 19, 20, 55 and 56.

Head greyish-ochreous. Antennae as usual with the first joint dark below, light above, the second joint entirely dark; the flagellum yellowish, the dark hairs giving a suggestion of darker rings. *Thorax* mainly dingy greyish-ochreous dorsally; margins of pronotum and mesonotum rather broadly dark brown, and a narrow dark brown line along the submedian row of bristles. *Abdomen* rather dark; ground-colour dingy ochreous; a pair of dark patches on the basal half of each segment, and a dark patch on the hind margins, narrowed in the middle. *Legs* with the pubescence shorter than usual; the rings complete; tips of the tarsal joints very little darkened. *Wings* with the normal venation; Ax curves evenly to the hind margin; M_3 touches M_{1+2} and in two of the three specimens it is fused with it for a short distance. The dark spots are rather larger than usual; that over the R-M cross-vein extends into the cell R_{2+3} . Veins dark, except the costa, R_s and R_{4+5} , which are more yellowish.

Type in the British Museum; paratypes in Mr. Patterson's collection.

Loc. GOLD COAST: Aburi, 8. i. 1911, 1 ♂ (*L. Armstrong*); 1912, 1 ♂ 1 ♀ (*W. H. Patterson*).

12. *S. ceylonica*, Edw. (July 1912).

Figs. 21, 22, 57, 58 and 59.

The characters given in the key, together with those of

the genitalia, are quite sufficient for the identification of this species, so that it is unnecessary to redescribe it.

Brunetti (1912) figures the hypopygium of this species. His figure is not very accurate, but contrary to my previous statement (1913) it evidently represents the true *S. ceylonica* in dorsal view, as correctly stated by him; moreover, it does not resemble that of *S. didyma*. However, although Brunetti's figure does represent this species, his elaborate redescription has proved to have been based on a mixed series, consisting probably of four species.

Type in the British Museum.

Loc. CEYLON: Weligama (*T. B. Fletcher*), 1 ♂. INDIA: Kankondigee, Sunderbuns, 14. xi. 09 (*J. T. Jenkins*), 1 ♀ at light on board launch; Bhogaon, Purneah district, N. Bengal (*C. Paiva*), 1 ♀; Puri, Orissa Coast (*N. Annandale*), 1 ♂ 1 ♀. MALAY STATES: Taiping (*L. Wray, junr.*), 1 ♂ 1 ♀. JAVA: Pasuruan (*Kobus*), 1 ♂ 1 ♀. FORMOSA: Tainan (*H. Sauter*), 5 ♂ 2 ♀. As this seems to be the most widely-spread species of the genus, the name *ceylonica* is unfortunate. I have confirmed the identification of all the above-mentioned specimens; in none of them was there any noticeable variation from the Ceylon type.

13. *S. vittata*, sp. n.

Figs. 23, 60, 61, 62 and 63.

Head brownish yellow with some darker patches and indications of a more yellowish median line. First joint of antennae yellow, brown beneath, second brown, rest yellow. *Thorax* brownish-yellow with rather indistinct darker markings consisting of four longitudinal lines, the outer pair being near but not at the margin of the mesonotum. Pronotum, scutellum and postnotum are as usual brown at the sides, yellow in the middle. *Abdomen* of male yellowish, with a broad, continuous median dark stripe which broadens out somewhat in the middle of each segment; hind margins of the segments darker brown; ninth tergite dark brown, rest of hypopygium yellow. In the female, even when the abdomen is not discoloured, the median dark stripe is much less distinct. *Legs* yellow; the rings narrow, incomplete ventrally and sometimes rather indistinct; on the hind tibiae the median ring may be absent altogether. Joints of tarsi of fore and mid legs slightly darker at their tips, those of hind legs scarcely perceptibly so. *Wings* with the veins yellow, except the ascending portion of Cu_1 , which is mainly black; a small black spot over the R-M cross-vein not extending into cell R_{2+3} ; other black spots as usual at the junction of

M_{1+2} and M_3 and at the angle of Ax, and smaller ones at each of the lower angles of the discal cell. Tip of Ax angulated, a distinct spur arising from the angle. Halteres yellow.

Type in the British Museum.

Loc. S. RHODESIA: Salisbury (G. A. K. Marshall), 1 ♂ (type), 1 ♀. NATAL: Malvern (G. A. K. Marshall), 1 ♂; Umhlali (K. H. Barnard), 1 ♀. PORTUGUESE EAST AFRICA: Delagoa Bay, 1 ♀. BRITISH EAST AFRICA: Nairobi (R. Ford), 1 ♀; Kabete (T. J. Anderson), 1 ♂; Wambogo (Alluaud and Jeannel), 2 ♀; lower forests of Mt. Kenya (Alluaud and Jeannel), 1 ♂. NYASALAND: Mt. Mlanje (S. A. Neave), 3 ♀. N. NIGERIA: Beri (J. J. Simpson), 1 ♀. GOLD COAST: Bibiani (H. G. F. Spurrell), 1 ♂ 1 ♀.

From its distribution it is probable that this is the species referred to by Osten-Sacken (1873) as existing in the Stockholm museum. I am informed, however, by Dr. Sjöstedt that the original *Caffraria* specimens are lost. This is the species which I formerly (1912) took to be *S. crassicosta* (Speiser), but a more careful comparison of the male genitalia revealed specific differences, and there is also an obvious difference in the colour of the male abdomen. The ovipositor of the female from the Gold Coast is figured in order to show its appearance when the apical appendages are more retracted.

14. *S. crassicosta* (Speiser 1908).

Idiophlebia crassicosta, Speiser, ♂.

Figs. 24, 25, 64 and 65.

A rather light yellowish species. Second joint of antennae dark. Dorsum of thorax with some darker patches, one just above the root of the wing being the most conspicuous. Abdomen light yellowish, except for pairs of brown spots at the hind corners of each segment; 6th and 7th segments largely dark. Rings on legs narrow but complete, normal in position. Wings with the usual dark spots, which are very distinct. Tip of Ax with a rather long spur.

Speiser's original series of 2 ♂ 2 ♀ really comprised two species; the male figured by him must be regarded as the type of *S. crassicosta*; the other male and one of the females are described below as *S. sjöstedti*, sp. n. The second female (which is not the one figured by Speiser) may be the

female of *S. crassicosta*, and is figured here as such, but it differs from the male in having the vein $R_2 + 3$ partly black.

Type in the Stockholm Museum.

Loc. KAMERUN (*Sjöstedt*), 1 ♂ 1 ♀.

15. *S. sjöstedti*, sp. n.

Idiophlebia crassicosta, *Speiser*, ♀.

Figs. 26, 27, 66 and 67.

Much resembles *S. crassicosta*, except in genitalia. Second joint of antennae all pale yellowish. Palpi yellow, the joints only slightly darker at their tips. Thorax yellowish brown without any distinct markings, except that the pronotum has a small pale median patch, the "collar" has its front margin darker, and the centre of the postnotum is pale. Legs missing. Dark spots on the wing less black and distinct than in *S. crassicosta* and the spur of Ax shorter.

Type in the Stockholm Museum.

Loc. KAMERUN (*Sjöstedt*), 1 ♂ (type) 1 ♀.

16. *S. annulipes* (*End.* 1912).

Pycnocrepis annulipes, *End.* (Feb. 1912).

Styringomyia howardi, *Alex.* (March 1912).

Figs. 28, 29, 68 and 69.

Closely resembles *S. sjöstedti* except in the genitalia. I have previously (1912) mentioned *S. howardi* as a synonym of *S. crassicosta*; this assumption was made on purely *a priori* grounds, and an examination of the type of *S. howardi* has since proved it to be incorrect.

Type of *annulipes* in the Stettin Museum; of *howardi* in Ithaca, N.Y.

Loc. MADAGASCAR: Ambodimanga (*Hammerstein*), 5 ♂. SEYCHELLES IS.: Silhouette, 6 ♂ 3 ♀; Mahé, 1 ♂; Dennis I. (*H. Scott*), 2 ♂. PORTUGUESE EAST AFRICA: Quilimane (*C. W. Howard*), 1 ♂ 1 ♀.

17. *S. formosana*, sp. n.

Figs. 9, 30, 31, 70, 71 and 72.

Head with two dark brown stripes on the occiput. First joint of antennae dark on the underside, second all dark. Palpi dark, the joints very little paler at the base. *Thorax*: front portion of pronotum pale in middle; collar pale, with dark front margin. Mesonotum brown, with a broad darker brown median stripe; margins pale; posterior humps pale in the middle. Scutellum pale

in the middle and at the sides. Postnotum with narrow pale median stripe. Pleurae, sternum, coxae and trochanters orange-yellow. *Abdomen* of male with the first two segments mainly dark; segments 3-6 as in fig. 9; segment 7 with a broad median dark stripe; eighth segment and hypopygium all yellow. In the female the abdomen is darker, without any distinct markings, though there are pale areas on the apical halves of the apical segments. *Legs* with the usual narrow dark rings, which are sometimes not quite complete; all the tarsal joints dark at the tip. *Wings* nearly clear, but there are small dark suffusions round the R-M cross-vein, and at the base of Cu_1 , though not on R_{2+3} or at the junction of M_{1+2} and M_3 . The vein M_{1+2} , the ascending portion of Cu_1 and the apex of Ax are dark, but the darkness does not extend on to the membrane. Tip of Ax variable in form, being either curved, angulated, or with a short or long spur.

Type in the Deutsch. Ent. Museum; paratypes in the British Museum.

Loc. FORMOSA: Tainan, 9 ♂ 5 ♀; Koshun, 1 ♂ 1 ♀ (*H. Sauter*). The species has previously been identified by Riedel (1913) as *S. crassicosta*.

18. *S. javana*, sp. n.

Figs. 8, 32 and 33.

Head yellowish; bristles yellow. Antennae yellow, with the first segment dark beneath, the second entirely dark. *Thorax* marked much as in *S. jacobsoni* (fig. 6), but rather lighter. *Abdomen* with segments 3-6 as in the figure; second segment yellowish with a pair of dark spots on the hind margin. *Legs* with the dark rings reduced almost to spots on the upper surface; the subapical ring on the hind femora and the ring in the middle of the hind tibiae are only just perceptible as a slight darkening. Joints of hind tarsi not at all darkened at their tips; those of fore and mid legs only slightly so. Tuft of black bristles at the tip of the middle tibia not so distinct as usual. *Wings* with the usual dark spots; veins not so infuscated at their tips; tip of Ax dark, bent backwards; M_{1+2} scarcely darker than the other veins.

Type in the Amsterdam Museum.

Loc. JAVA: Nongkodjadjar (*E. Jacobson*), 1 ♂.

19. *S. jacobsoni*, sp. n.

Figs. 6, 7, 34, 35 and 73.

Head as in *S. javana*, except that the bristles are black. *Thorax* marked as in fig. 6. *Abdomen* of male yellow with segments 3-6

marked with brown as in fig. 7; seventh segment with a median dark brown stripe expanded in the middle; hypopygium all yellow-ochreous. In the female the abdomen has a continuous, rather obscure, brown median stripe. *Legs* with the dark rings incomplete ventrally; in the male the ring in the middle of the hind tibia is very faint; joints of hind tarsi scarcely darkened at their tips. *Wings* as in *S. javana*, except that Ax is evenly curved to the hind margin.

Type in the Amsterdam Museum.

Loc. JAVA: Semarang, 2 ♂ 1 ♀; Batavia, 1 ♂ (type) 1 ♀ (*E. Jacobson*). Previously determined by de Meijere (1911) as *S. didyma*, Grim.

20. *S. fryeri*, sp. n.

Figs. 36, 37, 74 and 75.

Head yellowish, with darker patches near the neck. Antennae and palpi coloured as usual. *Thorax* brownish with some darker root markings, the most distinct of which is a patch just above the root of each wing; scutellum not distinctly darker at the sides. Some of the small admedian bristles are aggregated into a pair of small tufts towards the front of the mesonotum. *Abdomen* of male yellowish-brown, with traces of darker patches on the basal halves of the segments, most distinct on segments 6 and 7; there are also pairs of distinct dark brown spots on the hind margins of each of segments 2-7. Abdomen of female similarly but less distinctly marked. *Legs* with all the dark rings distinct and complete, the tips of all the tarsal joints dark. *Wings*: R_{2+3} a little more nearly vertical than usual; tip of Ax sharply curved to the hind margin. The dark spot over the R-M cross-vein just extends over the base of R_{2+3} ; all the veins slightly but distinctly darkened at their tips; a slightly darker cloud above Cu towards the base of the wing.

Type in the British Museum.

Loc. CEYLON: Peradeniya (*J. C. F. Fryer*), 1 ♂ (type) 1 ♀; also 1 ♀ in the Indian Museum from the same locality. This is the species referred to rather inaccurately by me (1913) as "*S. ceylonica*, Brun. (*nec* Edw.)." Brunetti's series contained only a single female.

21. *S. himalayana*, sp. n.

Figs. 40, 41 and 77.

Resembles *S. fryeri*, but a little smaller and much yellower, all the dark markings being reduced; thorax almost unicolorous yellow-ochreous; terminations of the veins (except that of Ax) not in the least darkened.

Type in the Indian Museum, Calcutta.

Loc. E. HIMALAYAS: Sukna (*N. Annandale*), 1 ♂ 1 ♀ *in coitu*. Previously included by Brunetti under *S. ceylonica*.

22. *S. nepalensis*, sp. n.

Figs. 42, 43, 78 and 79.

Resembles *S. fryeri*, but wing markings less sharply defined; vein Cu uniformly dark, but no suffusion just above it near the base; darkening of tip of Ax much less pronounced; no perceptible darkening at the tips of the other veins. Basal halves of abdominal segments of male darkened, but the dark spots on the hind margins of the segments are not clearly defined.

Type in the Indian Museum, Calcutta.

Loc. NEPAL: Sukhwani (*Mus. Collr.*), 1 ♂ 1 ♀. Previously included by Brunetti with *S. ceylonica*. The hypopygium rather closely resembles that of *S. himalayana*, of which species *S. nepalensis* may perhaps be only a variety.

23. *S. bancrofti*, sp. n.

Figs. 44, 45, 80 and 81.

Head yellow; antennae yellow with the second joint brown. *Thorax* yellowish brown; the pronotum as usual darker at the sides; mesonotum with two darker brown lines, jointed in front, diverging behind, and extending as far back as the suture; a small dark area above the root of each wing. *Abdomen* of male yellow with a dark patch on the basal half of each segment, broadest at its apex, and two more or less confluent dark spots on the hind margin of each segment. Female abdomen similarly marked. *Legs* with all the dark rings distinct, complete, the tips of all the tarsal joints dark. *Wings* with normal venation and markings; the veins yellowish except where the dark specks occur; Ax evenly curved to the hind margin.

In the hypopygium the upper claspers are very much reduced.

Type in the British Museum.

Loc. QUEENSLAND: Burpengary (*Dr. T. L. Bancroft*), 3 ♂ 2 ♀. Previously included by me (Aug. 1911) in *S. didyma*.

24. *S. didyma*, Grim. (1901).

Idiophlebia pallida, Grünberg (1903).

Figs. 38, 39 and 76.

Differs from *S. bancrofti* by the characters given in the key, as

well as in the genitalia. In the hypopygium the upper claspers are modified into strongly chitinised, downwardly projecting hooks, which make the hypopygium appear very different from that of any of the other species. I have not examined the type of *I. pallida*, but Grünberg's figures render its identification easy; he has, however, omitted the ninth tergite, which has a characteristic form.

Type of *S. didyma* in the British Museum; of *I. pallida* in the Berlin Museum; additional specimens in the Edinburgh Museum.

Loc. SANDWICH IS. : Honolulu, Waiahua (*Dr. R. C. L. Perkins*); CAROLINE IS. : Yap (*Volkens*).

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ADDENDUM.

Styngomyia leucopeza, sp. n.

Entirely black, with the following exceptions: the last 8–10 joints of the antennae, joints 2–4 of the front tarsi and joints 1–4 of the hind tarsi yellowish-white. Front femora and tibiae at the base, front metatarsi at the apex, middle tibiae and the first four joints of the middle tarsi at the base, and the hind tibiae at the base, narrowly yellowish-brown. An ill-defined yellowish-brown ring near the base of the middle femora. Abdomen and legs somewhat shining. *Wings* with normal venation; somewhat strongly infuscated; darker markings in the usual positions, but ill defined and much larger than usual, the spot over the R-M cross-vein extending upwards to the costa. *Hypopygium*: 9th tergite deeply indented at the apex; side pieces with one terminal spine.

Loc. NYASALAND: Mlanje, Jan.–Feb. 1914, 8 ♂ 1 ♀ (Dr. J. B. Davey).

Types presented to the British Museum by the Imperial Bureau of Entomology.

EXPLANATION OF PLATES XIX–XXV.

[All the figures of genitalia are magnified 50 diameters, the rest 13 diameters. Except in the case of *S. crassicosta*, all the figures of genitalia have been prepared from specimens cleared in potash and mounted in balsam; it should be noted that owing to this treatment the apical parts are more exerted and the male hypopygium appears broader than in the dry specimens.]

FIG.

- | | |
|---------------------------------|------------------------------------|
| 1. <i>S. variegata</i> , sp. n. | Head, thorax, and part of abdomen. |
| 2. „ | Wing. |

FIG.

3.	<i>S. lineaticeps</i> , sp. n.	Thoracic markings.
4.	" "	Wing.
5.	<i>S. marshalli</i> , sp. n.	"
6.	<i>S. jacobsoni</i> , sp. n.	Thoracic markings (σ^7).
7.	"	Abdominal markings of σ^7 (4th segment).
8.	<i>S. javana</i> , sp. n.	" " " " "
9.	<i>S. formosuna</i> , sp. n.	" " " " " (3rd and 4th segments).
10.	<i>S. flava</i> , Brun.	Male hypopygium from above.
11.	"	" " " " below.
12.	<i>S. solocipennis</i> , End.	" " " " above.
13.	"	" " " " below.
14.	<i>S. lineaticeps</i> , sp. n.	" " " " " (outline of ninth tergite dotted in).
15.	<i>S. impunctata</i> , sp. n.	Male hypopygium from above.
16.	" "	" " " " below.
17.	<i>S. variegata</i> , sp. n.	" " " " above.
18.	" "	" " " " below.
19.	<i>S. nigripalpis</i> , sp. n.	" " " " above.
20.	" "	" " " " below.
21.	<i>S. ceylonica</i> . Edw.	" " " " above.
22.	"	" " " " below.
23.	<i>S. vittata</i> , sp. n.	" " " " above.
24.	<i>S. crassicosta</i> , Speiser.	" " " " "
25.	"	" " partly from side.
26.	<i>S. sjöstedti</i> , sp. n.	" " from above.
27.	" "	" " " " the side.
28.	<i>S. annulipes</i> (End.).	" " " " above.
29.	"	" " " " below.
30.	<i>S. formosuna</i> , sp. n.	" " " " above.
31.	" "	" " " " below.
32.	<i>S. javana</i> , sp. n.	" " " " above.
33.	" "	" " " " below.
34.	<i>S. jacobsoni</i> , sp. n.	" " " " above.
35.	" "	" " " " below.
36.	<i>S. fryeri</i> , sp. n.	" " " " above.
37.	" "	" " " " below.
38.	<i>S. didyma</i> , Grim.	" " " " above.
39.	"	" " partly from side.
40.	<i>S. himalayana</i> , sp. n.	" " from above.
41.	" "	" " " " below.
42.	<i>S. nepalensis</i> , sp. n.	" " " " above.
43.	" "	" " " " below.

FIG.						
44.	<i>S. bancrofti</i> , sp. n.	Male hypopygium	from	above.		
45.	" "	" "	" "	below.		
46.	<i>S. obscura</i> , Brun.	Tip of ♀ abdomen	from	above.		
47.	" "	" "	" "	below.		
48.	<i>S. marshalli</i> , sp. n.	" "	" "	above.		
49.	" "	" "	" "	below.		
50.	<i>S. lineaticeps</i> , sp. n.	" "	" "	" "		
51.	<i>S. nigrofemorata</i> , sp. n.	" "	" "	" "		
52.	<i>S. impunctata</i> , sp. n.	" "	" "	above.		
53.	" "	" "	" "	below.		
54.	<i>S. variegata</i> , sp. n.	" "	" "	" "		
55.	<i>S. nigripalpis</i> , sp. n.	" "	" "	above.		
56.	" "	" "	" "	below.		
57.	<i>S. ceylonica</i> , Edw.	" "	" "	above.		
58.	" "	" "	" "	below.		
59.	" "	" "	" "	side.		
60.	<i>S. vittata</i> , sp. n.	" "	" "	above	(Mashona	
					land).	
61.	" "	" "	" "	below	" "	
62.	" "	" "	" "	above	(Gold	
					Coast).	
63.	" "	" "	" "	below.		
64.	<i>S. crassicosta</i> , Speiser.	" "	" "	above.		
65.	" "	" "	" "	below.		
66.	<i>S. sjöstedti</i> , sp. n.	" "	" "	above.		
67.	" "	" "	" "	below.		
68.	<i>S. annulipes</i> , End.	" "	" "	above.		
69.	" "	" "	" "	below.		
70.	<i>S. formosana</i> , sp. n.	" "	" "	above.		
71.	" "	" "	" "	below.		
72.	" "	" "	" "	side.		
73.	<i>S. jacobsoni</i> , sp. n.	" "	" "	below.		
74.	<i>S. fryeri</i> , sp. n.	" "	" "	above.		
75.	" "	" "	" "	below.		
76.	<i>S. didyma</i> , Grim.	" "	" "	" "		
77.	<i>S. himalayana</i> , sp. n.	" "	" "	above.		
78.	<i>S. nepalensis</i> , sp. n.	" "	" "	" "		
79.	" "	" "	" "	below.		
80.	<i>S. bancrofti</i> , sp. n.	" "	" "	above.		
81.	" "	" "	" "	below.		

